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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,338	07/22/2003	Clayton M. Grondahl	GRON-0002	6985

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HOFFMAN WARNICK & D'ALESSANDRO, LLC
75 STATE STREET
14TH FLOOR
ALBANY, NY 12207

EXAMINER

REESE, DAVID C

ART UNIT	PAPER NUMBER
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3677

MAIL DATE	DELIVERY MODE
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07/16/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/624,338	GRONDAHL, CLAYTON M.	
	Examiner	Art Unit	
	David C. Reese	3677	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6-9, 11-13, 15-21 and 23-26 is/are pending in the application.
- 4a) Of the above claim(s) 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-9, 11-13, 15-21, 23, 24 and 26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

THIS NON-FINAL ACTION IS RESPONSIVE TO THE AMENDMENT FILED 4/12/2007.

- Claims 5, 10, 14, and 22 were canceled.
- Claims 1, 9, 19, 24, and 26 were amended.
- Claim 25 is withdrawn.
- Claims 1-4, 6-9, 11-13, 15-21, and 23-26 are pending.

The indicated allowability of claims 3-5, 11-15, and 21-22 are withdrawn in view of the newly discovered reference(s) to Gail et al US-5,975,535. Rejections based on the newly cited reference(s) follow.

Claim Objections

[1] Claim(s) 1, 9, 24, and 26 were previously objected to because of informalities. Applicant has successfully addressed these issues in the amendment filed on 4/12/2007. Accordingly, the objection(s) to the claim(s) 1, 9, 24, and 26 have been withdrawn.

However, as amended:

[2] Claim 11 is objected to because of the following informalities: it is dependent upon a canceled claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

[3] The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

[4] Claims 1, 3-4, 8-9, 11-13, 15-17, 19, 21, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gail et al (“Gail”, U.S. Patent No. 5,975,535) in view of Webster et al (“Webster”, U.S. Patent No. 6,220,602).

Although the invention is not identically disclosed or described as set forth 35 U.S.C. 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a designer having ordinary skill in the art to which said subject matter pertains, the invention is not patentable.

With respect to claims 1, 9, 19, and 24, Gail discloses of a seal assembly (see figure below) comprising:

a brush seal (1) with a plurality of staggered seal members, each brush seal member including:

a free portion (2) [adapted to be] angled relative to a longitudinal axis and all radial axes of a component (4) to be sealed against; and

a fixed portion (3) that is angled relative to free portion (2) and adapted to be one of substantially parallel to and substantially perpendicular to the longitudinal axis of the component (4) to be sealed against; and

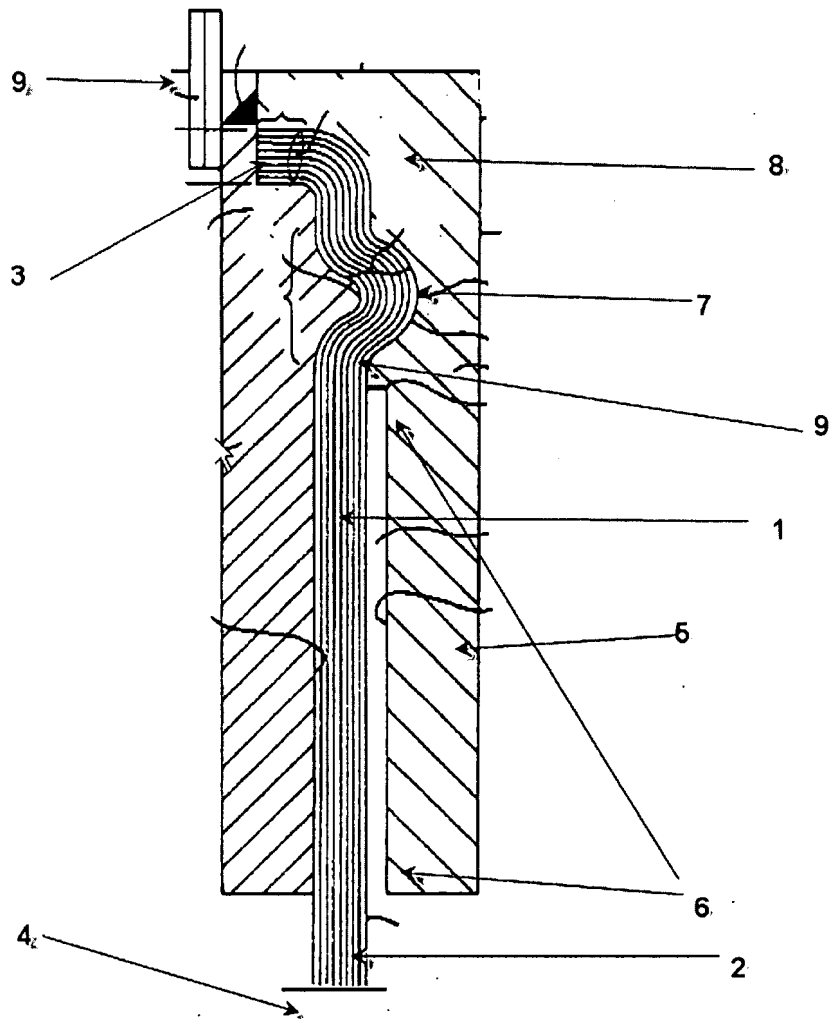
a support (5) coupled to a low pressure side of the seal for supporting the free portion (2), the support (5) having a support portion facing a high pressure side of the seal,

wherein the free portion (2) contacts a distal end (6) in an pressurized operative state (col. 5, lines 18-36, “...are elastically deflectable in the circumferential direction and to a limited

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extent also in the axial direction...while running”) and is out of contact with the distal end (6) in an unpressurized inoperative state (Fig. 1), the fixed portion (3) of the seal is angled relative to the free portion (2) in both the operative and inoperative states, and the free portion (2) is adapted to be closer to the component (4) to be sealed against during the pressurized operative state than in the unpressurized inoperative state (col. 5, lines 18-36, “...are elastically deflectable in the circumferential direction and to a limited extent also in the axial direction...while running motion of rotor”).

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Gail discloses the seal to be brush seal, not a leaf seal as claimed.

Webster teaches a seal arrangement where either a brush seal or leaf seal may be used (column 7, lines 44, 45), thereby establishing the seals as equivalent. It would have been obvious to one having ordinary skill in the art at the time of the invention to use either a brush seal or leaf seal, as Webster teaches these seals to be equivalent and interchangeable.

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Re: Claim 3, wherein the support portion (5) includes a curved surface (7) extending from a proximate end (8) of the support portion (5) to the distal end (6), and the free portion (2) extends tangentially (9) from the curved surface in the operative state.

Re: Claim 4, wherein the proximate end (8) is coupled to a mount portion (9) of the support that mounts the support (5) to a stationary component.

Re: Claim 8, wherein the fixed portion (3) is positioned substantially perpendicular to a longitudinal axis of a component (4) to be sealed, and the free portion (2) is angled out-of-plane relative to the fixed portion (3).

Re: Claim 11, wherein the distal end (6) of the support (5) portion is thinner than a proximate end (8) of the support portion, and the proximate end (8) is in contact with the free portion in the inoperative state (at 9).

Re: Claim 12, wherein the support portion (5) includes a curved surface (7) extending from a proximate end (8) to the distal end (6).

Re: Claim 13, wherein the proximate end (8) is coupled to a mount portion (9) of the support that mounts the support (5) to a stationary component.

Re: Claim 15, further comprising a holder for mounting the seal assembly to a stationary component, wherein the holder includes a projection for protecting the free portion (see area below and around 8 in the figure above).

Re: Claims 16 and 17, the combination of Gail and Webster teaches the fixed portion (6) to be provided by an arcuate member in each leaf seal member. Examiner notes that because the seal extends around a rotary shaft, it is essentially circular, which will include arced portions.

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Gail shows the free end portion to be circumferentially parallel to a surface of the rotatable component.

Re: Claim 21, wherein the support portion (5) includes a curved surface (7) extending from a proximate end (8) to the distal end (6).

Re: Claim 23, wherein the fixed portion (3) is positioned substantially perpendicular to a longitudinal axis of a component (4) to be sealed, and the free portion (2) is angled out-of-plane relative to the fixed portion (3).

[5] Claims 2, 18, 20, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gail in view of Webster as applied to claims above, and further in view of Halowach et al ("Halowach", U.S. Patent No. 4,813,608). Gail and Webster fail to disclose the leaf seal layers to be made from different materials, where a first material addresses a high pressure side of the seal and a second material addresses a low pressure side of the seal, where the material has a lower coefficient of thermal expansion than the second material.

Halowach discloses a leaf seal assembly (40) comprising two layers of different material with different coefficients of thermal expansion. The two layers are bonded together, such that the different rate of expansion between the two layers causes the seal to bend in a preferred direction, which results in the formation of a tight air seal between adjoining structures (column 2, lines 13-24). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Gail and Webster as taught by Halowach, such that the layers are made of materials with different coefficients of thermal expansion, so that the differing rates of expansion causes the seal to bend, forming a tight air seal between the structures.

[6] Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gail in view of Webster as applied to claim 1 above, and further in view of Mackay et al ("Mackay", U.S. Patent No. 5,042,823). Gail and Webster fail to disclose the plurality of staggered leaf seal members (3, 4) to be provided by a single strip of material.

Mackay teaches a leaf seal arrangement (54) made from single strip of material. Manufacturing a multi-layered seal from a single strip of material lowers manufacturing costs because the seal can then be assembled in a simpler fashion, as opposed to cutting two different layers to length and connecting the layers together to form the seal. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Gail and Webster as taught by Mackay, such that the seal is made from a single strip of material, in order to reduce manufacturing costs. Mackay further discloses the leaf seal members to be fixed by a weld.

Response to Arguments

[7] Applicant amendment filed 4/12/2007 regarding rejections under 35 U.S.C. 103 have been fully considered. Due to the amendment to the claims, the prior art fails to further anticipate. Accordingly, the Examiner has withdrawn all previous rejections over Gail et al. US-6,352,263. However, upon further consideration of the amended claims, a new ground(s) of rejection is made in view of Gail et al. US-5,975,535 with other art as described above. Consequently, all arguments are considered moot to said new grounds of rejection. Please also note the additional notice of reference cited.

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Conclusion

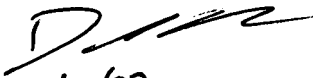
[8] THIS ACTION IS NON-FINAL

[9] Any inquiry concerning this communication or earlier communications from the examiner should be directed to David C. Reese whose telephone number is (571) 272-7082. The examiner can normally be reached on 7:30 am-6:00 pm Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, J.J. Swann can be reached at (571) 272-7075. The fax number for the organization where this application or proceeding is assigned is the following: (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DCR


7/5/07

David Reese
Assistant Examiner
Art Unit 3677

Katherine Mitchell
Primary Examiner

